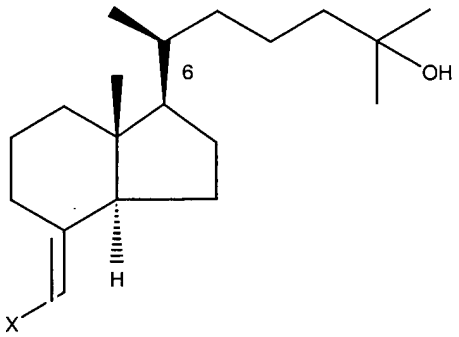
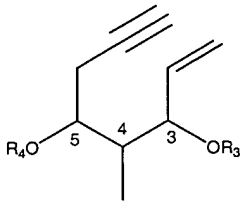
Claim 4 (Amended) A method for producing a vitamin D_3 compound described in claim 3, comprising reacting an exo-methylene compound of formula (II):



wherein X is a bromine atom or an iodine atom, with an eneyne compound of formula (III):



wherein R3 and R4 are each independently a hydrogen atom or a tri (C_1 to C_7 hydrocarbon) silyl) group in the presence of a palladium catalyst, and optionally removing the protecting group of the tri (C_1 to C_7 hydrocarbon) silyl) group, and further wherein the vitamin D_3 derivative is

(i) (20S)-1α, 25-dihydroxy-2β-methyl-3β-vitamin D_3;

(ii) (20S)-1β, 25-dihydroxy-2β-methyl-3α -vitamin D_3;

(iii) (20S)-1α, 25-dihydroxy-2α-methyl-3β-vitamin D_3;

(iv) (20S)-1α, 25-dihydroxy-2α-methyl-3α -vitamin D_3.